

## REMARKS

1. Claim 1 was rejected under 35 U.S.C. 112, second paragraph as being indefinite. The Examiner asserts that the term “an advanced stage of ageing” in claim 1 is a relative term which renders the claim indefinite. Applicants respectfully point the Examiner to page 4, lines 10-15 of the application text as filed for the definition of “an advanced stage of ageing.” The term “an advanced stage of ageing” is not a relative term but is defined in specific terms of cumulative olefin oxide production.

Additionally, Claim 1 has been amended to recite “maintaining the reaction conditions for at least a period of time which is sufficient to effect a cumulative olefin oxide production of at least 1000 kmole of olefin oxide per m<sup>3</sup> catalyst bed before the catalyst has reached an advanced stage of ageing.” This amendment is intended to improve the clarity of Claim 1. In particular, the reaction conditions, as defined, are to be maintained for at least a period of time which is sufficient to effect a cumulative olefin oxide production of at least 1000 kmole of olefin oxide per m<sup>3</sup> catalyst bed before the catalyst has reached an advanced stage of ageing, i.e., before the catalyst has produced a cumulative olefin oxide production of at least 10,000 kmole of olefin oxide per m<sup>3</sup> catalyst bed. Claims 5 and 8 have been amended to recite “5000 kmole of olefin oxide per m<sup>3</sup> catalyst bed before the catalyst has reached an advanced stage of ageing.” These amendments are intended to improve the consistency with amended Claim 1.

2. Claims 1-10, 12, 23 and 24 were rejected under 35 U.S.C. 103(a) as being unpatentable over G.B. 1191983 (hereinafter “the ‘983 publication”) in view of Lauritzen U.S. 4766105 (hereinafter “the ‘105 publication”) and Evans et al. U.S. Patent No. 6,372,925 (hereinafter “the ‘925 publication”). This rejection is respectfully traversed. The M.P.E.P. § 2143 states:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant’s disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991).

The '983 publication relates to the production of ethylene oxide by reacting ethylene and oxygen. The '983 publication teaches catalytic oxidation of ethylene using a reaction feed containing substantially pure ethylene in a quantity of more than 86 %v and oxygen, without dilution with other gases. *G.B. Patent No. 1,191,983*, page 1, lines 42-62. This oxidation process leads to high selectivity in conversion of ethylene at high conversion rates resulting in considerable improvement in the rate of production of ethylene oxide. *Id.* at page 2, lines 54-64.

The '105 publication also relates to the production of ethylene oxide by reacting ethylene and oxygen. *U.S. Patent No. 4,766,105*, column 1, line 66 – column 2, line 6. The '105 publication discloses a reaction feed containing one or more diluents and ethylene in a concentration of 1 to 40 %. *Id.* at column 17, lines 11-16; Table 2. In particular, the working examples of the '105 publication disclose a reaction feed consisting of 30 % ethylene, 8.5 % oxygen, 7 % carbon dioxide, 54.5 % nitrogen, and 4.4 to 5.6 parts per million by volume vinyl chloride. *Id.* at column 20, lines 26-30.

The '925 publication relates to the production of ethylene oxide by reacting ethylene and oxygen. *U.S. Patent No. 6,372,925*, column 2, lines 49-55. The '925 publication teaches improving the activity and selectivity of an aged high selectivity catalyst by increasing the ethylene concentration in the reaction feed when the catalyst has reached an advanced age. *Id.* at column 2, lines 49 – column 3, lines 14. The '925 publication discloses a reaction feed containing inert gases such as nitrogen, argon, and saturated hydrocarbons. *Id.* at column 5, lines 13-15. The '925 publication also discloses a reaction feed containing ethylene in a concentration of 2 to 40 mole-% during the initial operation phase of the catalyst. During the further operation phase of the aged catalyst, the ethylene concentration is raised by 5 to 30 mole-%, preferably 10 to 20 mole-%. *Id.* at column 3, line 67 – column 4, line 10. In particular, the working examples of the '925 publication disclose reaction feeds containing over 30 % nitrogen ballast gas and 25-55 mole-% ethylene for testing both fresh and aged catalysts. *Id.* at column 7, lines 6-21; Table I.

There is no suggestion or motivation to modify or combine the '983 publication in view of the teachings of the '105 and '925 publications to arrive at the present invention. M.P.E.P. 2143.01(V) states: "If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification." The invention of the '983 publication requires a reaction feed containing more than 86 %v ethylene and a balance of

oxygen, without dilution with other gases, in order to obtain the advantages in the oxidation process of high selectivity in conversion of ethylene at high conversion rates which leads to a considerable improvement in the rate of production of ethylene oxide. It is key to the invention of the '983 publication that there are no dilution gases present in the reaction feed. The '105 and '925 publications disclose the presence of dilution gases in the reaction feed and ethylene concentrations below 86 %v. If the '983 publication was modified in view of the teachings of the '105 and '925 publications, the modification would render the invention of the '983 publication unsatisfactory for its intended purpose, i.e., an oxidation process leading to high selectivity in conversion of ethylene at high conversion rates.

Further, M.P.E.P. 2145 (X)(D)(2) states: "It is improper to combine references where the references teach away from their combination." As discussed above, the '983 publication expressly excludes dilution of the reaction feed with other gases and the '105 and '925 publications expressly teach the use of dilution gases in the reaction feed.

Therefore, there is no suggestion or motivation to modify or combine the '983, '105 and '925 publications to arrive at the present invention.

Additionally, there is no reasonable expectation of success. As discussed hereinbefore, modifying the '983 publication in view of the teachings of the '105 and '925 publications would render the invention of the '983 publication unsatisfactory for its intended purpose. Also, the publications expressly teach away from their combination, as discussed above. Therefore, there cannot be a reasonable expectation of success when modifying or combining the '983, '105 and '925 publications.

Further, the '983, '105 and '925 publications do not teach or suggest all the claim limitations. The publications do not teach or suggest reacting an olefin and oxygen such that before the catalyst has reached an advanced stage of ageing, reaction conditions comprise a reaction temperature above 255 °C and an olefin content of the feed in the range of from above 25 mole-% to at most 80 mole-%, relative to the total feed, and maintaining the reaction conditions for at least a period of time which is sufficient to effect a cumulative olefin oxide production of at least 1000 kmole of olefin oxide per m<sup>3</sup> catalyst bed before the catalyst has reached an advanced stage of ageing.

In view of these arguments, Applicants believe that a *prima facie* basis for obviousness has not been established for Claims 1-10, 12, 23 and 24 and respectfully request that the rejection be withdrawn.

**CONCLUSION**

Allowance of Claims 1-10, 12, 23 and 24 of the present application is respectfully requested. If the examiner would like to discuss this case with Applicants' attorney, the Examiner is invited to contact Richard Lemuth at the phone number below.

Respectfully submitted,  
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